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# Postoperative Recovery of Mechanical Muscle Function in Hip Replacement Patients

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## INTRODUCTION

Muscle function in patients with hip osteoarthritis (OA) is not well-studied. We established a new setup of tests in order to monitor patients before and after surgery. Our novel setup was used to evaluate single- and multi-joint strength (torque) and power in a group of 40 – 65 year old hip patients.

## MATERIAL AND METHODS

**Patients:** Forty elderly patients (age  $55 \pm 6$ , BMI  $27.5 \pm 4.1$ ) with unilateral osteoarthritis participated in this prospectively study and were randomized to either total or resurfacing hip replacement. All implants inserted by two senior surgeons using only the posterior-lateral approach. Prior to surgery no training program was initiated but the patients were encouraged to live as usual. Post surgery all patients were allowed fully weight-bearing and they were instructed to follow a conventional home-based rehabilitation, but were otherwise not engaged in any formal training. **Parameters:** In vivo isometric peak strength/torque ( $T_{max}$ ) and rate of torque development (RTD) were measured during unilateral knee extension and flexion but also extension, flexion, adduction and abduction of the hip muscle groups were evaluated. Data was obtained pre, 8, 26 and 52 weeks post surgery for both the affected (AF) as well as the non-affected (NA) side. **Protocol:** All contractions were performed ad libitum and for each muscle group 3 trails of 4s duration were performed. The trail with highest peak torque was used for further analysis. **Statistics:** Paired students t-test for between group comparisons while ANOVA was used for repeated measures for comparisons over time ( $\alpha=0.05$ )

## RESULTS

The results were calculated as deficits in percentages of the unaffected side ( $(A-NA/NA)*100$ ) in order to evaluate degree of asymmetry. Our overall side-to-side deficits for peak torque ranged from 32.6 to 0.4% and hip flexion deficit being significantly more impacted then the other muscle groups (32.6%). At baseline all muscle groups showed a significant torque deficit. At 8 weeks post surgery that asymmetry had increased for 4 out of 6 muscle groups. At 26 weeks the hip adduction and hip flexion deficit remained significant whereas abduction and hip extension only tended to be lower. Both knee flexion and extension had normalized as compared with the contra lateral side. One year post surgery all but hip flexion and hip adduction had normalized. ANOVA repeated measure showed a significant improved asymmetry over time for all muscle groups.

## CONCLUSIONS

The data showed a persisting loss in maximal muscle torque in the OA hip until 26 weeks post surgery. Following that time period normalization was observed for all but hip flexion and -adduction.